ESSDD

Interactive
comment

Interactive comment on "Hydromorphological attributes for all Australian river reaches derived from Landsat dynamic inundation remote sensing" *by* Jiawei Hou et al.

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General comments:

This paper presents a novel analysis of river hydromorphology over Australia. The study combines GIS information from the Geofabric database and remote sensing data from the WOfS dataset to track spatial recurrence intervals of surface water along river corridors. Then the study examines several hydraulic scaling relationships (e.g. width, discharge, drainage area) and creates an innovative classification scheme to characterize flow permanence of Australian rivers. While there are some major assumptions involved in the methodology that likely bias the results, I think that this study is suffi-

ciently novel and well presented to be a valuable contribution to hydrology.

Please note that the link to this study's data repository is broken and therefore I am unable to assess the quality of the dataset: http://dx.doi.org/10.25914/5c637a7449353 and I didn't see the dataset at http://wald.anu.edu.au/data/

Specific comments:

I suspect that this study's method likely substantially overestimates river width because it assumes that all surface water measured within a given subcatchment is river water. This means that all oxbow lakes, impoundments, wetlands and other lentic waterbodies will be counted in the river width calculation. This point is briefly mentioned in the Discussion but should be acknowledged in the method section as a major assumption and limitation of the Methods and should be further discussed in the Discussion. For example, how does this assumption affect the relationship between recurrence interval and river width? Does this approach overestimate width variability with changes recurrence frequency? Would the authors be able to quantify the degree to which this approach affects their width estimates using a sample of subcatchments?

This study assumes that maximum river width corresponds to the recurrence interval of when the Landsat imagery does not show artifacts associated with cloud, shadow, or the SLC-error. This seems like an arbitrary threshold and could use more justification. Could this assumption be better justified or further discussed?

Table 4 – readers may be interested in the variability of the parameters shown.

In the methods or discussion the authors should provide an indication (preferably quantitatively) of the uncertainty of the input variables that are used in this analysis (e.g., slope, runoff, width).

Add a quick sentence about the method(s) used to define river segments and subcatchment extent in Muller et al. This is an important piece of information that likely impacts the results of this study considerably.

P7 L18: "We excluded river widths with small upstream cumulative runoff (<104.5 m3 or 0.37 m3/s)" – please provide the reviewers with the plot over the full range of data so we can judge the appropriateness of this action.

Table 6: Andreadis et al. (2013) used hydraulic geometry equations from Moody and Troutman, (2002) - https://doi.org/10.1002/esp.403. It would be better to cite this paper in this table. Also, a recently-published study has done a similar analysis at the global scale and should at least be included in Table 6, if not elsewhere in the manuscript. https://doi.org/10.1029/2019GL082027

Technical corrections:

P2 L4: insert "a" before "channel"

P4 L 24: change "This step required considerable computing, and we used high-performance computer" to "This step required considerable computational power, and so we used a high-performance computer"

P4 L25: "equivalent river width" I was unable to access Vincenty, 1975 to properly evaluate the meaning of equivalent river width but believe this is typically referred to as "effective width" (e.g., https://doi.org/10.1029/2007WR006133)

P6 L25: change "rivers" to "river"

P7 L18: replace "way" with "method" and add "to our data" to the end of the sentence

P8 L5: please define "standard differences"

P8 L9-10: change "Similarly, the WOfS data continues to receive updates." to "Similarly, the WOfS data will continue to receive updates."

P10 L21-22: replace "(Donchyts et al., 2016; Pekel et al., 2016), for example." with "Donchyts et al. (2016) or Pekel et al. (2016), for example.

Table 1: in my opinion, it doesn't seem necessary to have this table in the manuscript.

Frequency is pretty self-explanatory, although this is just a suggestion. If the authors decide to leave in Table 1, add a vertical line down the middle of table to show that the table has two columns of two columns – it is a little confusing as it is present now

Figure 2: please make the map legend larger

Figure 7: add a label to the legend and replace "Curves" with "Curve" in the caption

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Discussion paper